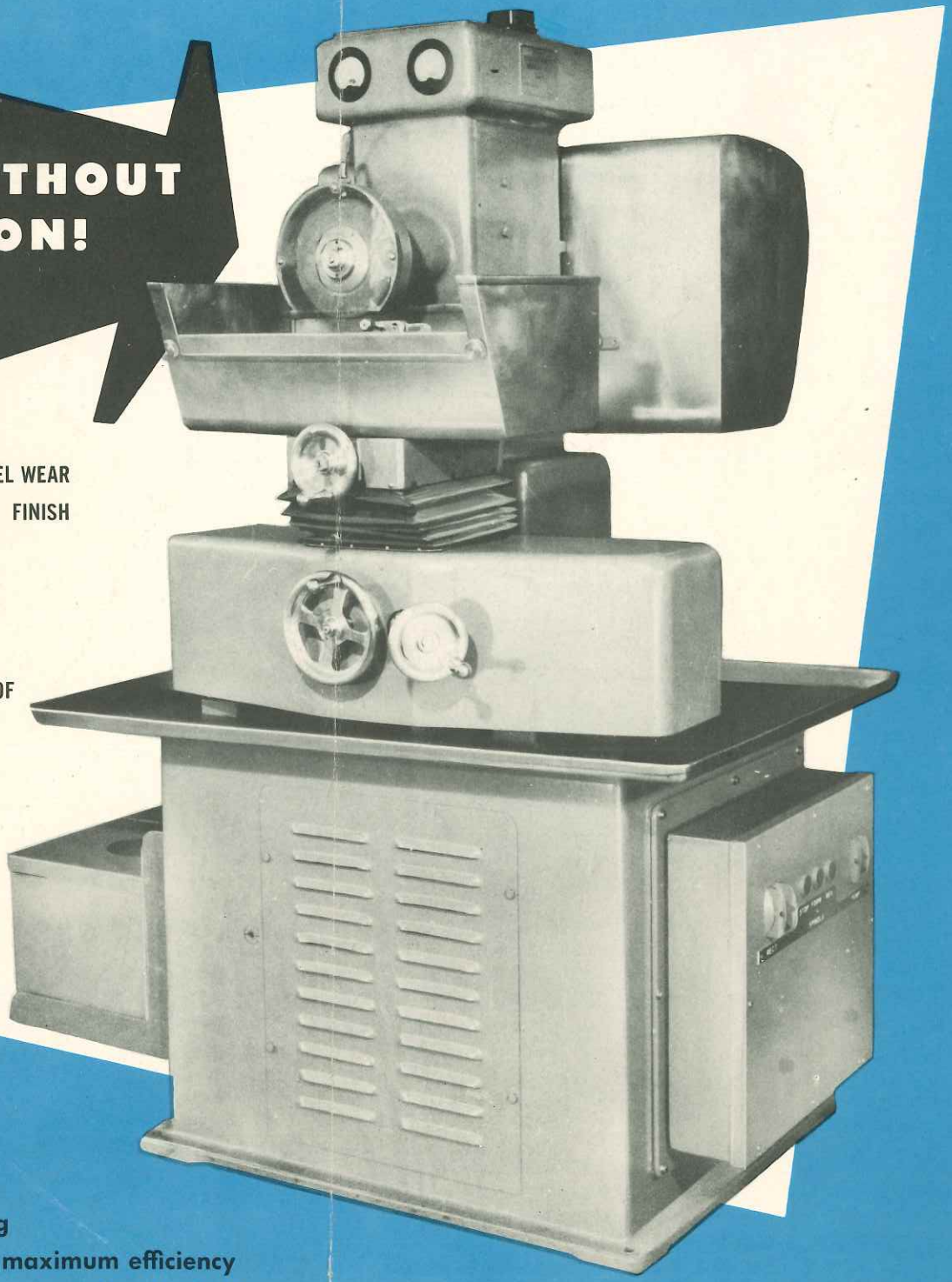
The new concept in machining that means greater efficiency . . . lower costs for your shop

Everite

ELECTROCHEMICAL MACHINE TOOL H-2

FOR SHARPENING CARBIDES

GRINDS WITHOUT ABRASION!



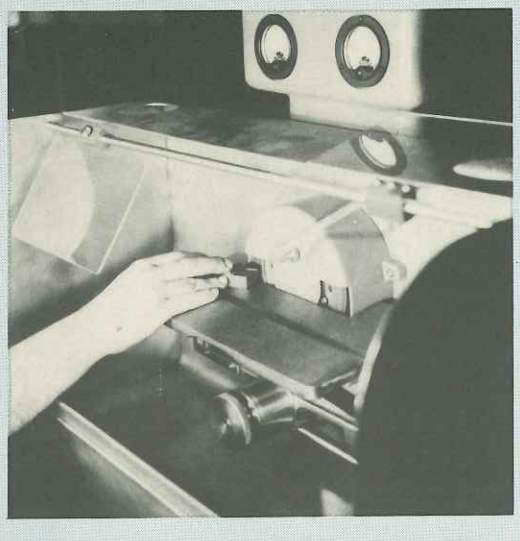
- NEGLIGIBLE DIAMOND WHEEL WEAR
- FINE, UNIFORM SURFACE FINISH
- INCREASE IN TOOL LIFE
- FAST METAL REMOVAL
- ELIMINATES REJECTS DUE TO THERMAL CRACKING
- SIMULTANEOUS SHAPING OF CARBIDE & SHANK
- ROUGHING, FINISHING IN ONE OPERATION
- LOW OVERALL COST

The *only* electrochemical machine tool incorporating *all* features necessary for maximum efficiency in forming chip-breakers and off hand grinding.

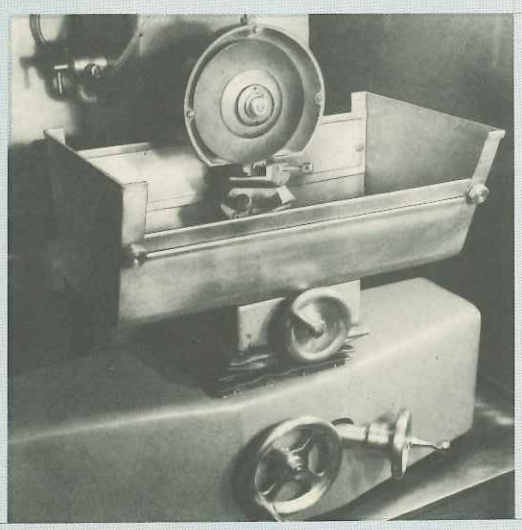
EVERITE MACHINE PRODUCTS COMPANY

2005 E. HUNTINGDON ST. PHILADELPHIA 25, PENNA.

EVERITE ELECTROCHEMICAL MACHINE TOOL H



Economical shaping of single point carbide tools is accomplished on the off-hand side of the Electrochemical Machine Tool H-2. By applying very mild pressure on the tool against the rotating cathode and observing the current flow on the ammeter, one is surprised to find how effective electrochemical machining is. The idea of machining without pressure and abrasion is a concept difficult to fathom for the operator experienced in conventional grinding techniques. Yet, the Electrochemical Machine not only functions in this manner, but it also shapes tools at a considerably faster rate. Furthermore, the elimination of heat checks and the quality of finish gives longer wear life.



Efficient Chip Breaker shaping of carbides is accomplished on the Electrochemical Machine Tool H-2. One pass of the wheel over the tool can cut a chip breaker ¼" wide and to any required depth in a matter of seconds and at a fraction of the usual diamond wheel wear. The resulting chip breaker will be smooth, accurate and without thermal cracks that are notorious with conventional diamond grinding. Since the process is a highly efficient electrochemical one and almost free of abrasion, there is no heat generated at the cutting edge.

Remarkable machining rates and wheel conservation makes this machine desirable in any shop where Chip Breaker cutting presents a grinding problem.

In the year 1833 Michael Faraday contributed to science his Laws of Electrolysis. He indicated that the amount of metal removed from or deposited on an electrode is proportional to the amount of electricity that passes. This principle has been employed advantageously in electro-plating processes since then. On the Everite Electrochemical Machine Tool H-2 Faraday's concepts also apply, but the application in machining of hard conductive materials is revolutionary, indeed, and highly effective.

In the machining process a tool which is made anodic (+) is brought into contact with a rotating wheel, the cathode (−). An electrolyte is used to pass the current between the anode and cathode, thus completing the circuit which causes metal to dissolve at the anode. The material normally formed at the anode is wiped away by rotational action of the cathode. The resultant effect is controlled metal removal by electrochemical dissolution in accordance with Faraday's Laws.

For most applications a metal bonded diamond wheel is suitable as a cathode. The anode (tool to be sharpened) is held in contact with the rotating diamond wheel with just sufficient pressure to maintain contact. The anode-cathode interface has a gap distance of very small magnitude, and currents of very high densities are obtained at low voltages. The primary function of the diamonds in the wheel is to wipe away any insoluble anode reaction products from the workpiece.

Why Electrochemical?

Typically, the grinding of carbide tools involves a number of operations. Silicon carbide wheels of different grades are used for roughing and finishing and diamond wheels of various grades for rough and fine lap finishing. The life of these abrasive wheels is limited. They are designed so that abrasive grains tear loose upon dulling and thus expose the underlying abrasive particles with sharp undamaged edges. Unless fresh particles are exposed, the rate of carbide removal diminishes to a useless level. This means that unless the

work engages the wheel uniformly, a flat workface cannot be maintained and continuous wheel dressing becomes necessary.

In the electrochemical approach, wheel wear is held to a very low level since the removal of carbide is substantially electrochemical and not mechanical in nature. Only one wheel is required to provide the finest finish (5-10 microinches RMS), regardless of the roughness of the carbide surface being treated. Furthermore, the dangers of thermal shock effects and stress raisers in the form of fine abrasive scratches are practically non-existent. At all times the work remains at ambient temperature. Heat cracks do not occur. Tool service life is increased, and rejects due to cracking of tools during grinding are eliminated.

What Does the Everite Electrochemical Machine Tool H-2 Offer?

1 — It is the only machine tool for sharpening carbides wherein a complete package has been provided in the form of a unit specifically designed to handle corrosive electrolytes and capable of performing electrolysis without the aid of an outside D. C. source. The power source is an integral part of the machine.

2 — The Everite Electrochemical Machine Tool H-2 operates on the basis of Electrolysis between a rotating cathode and an anode (tool to be sharpened) brought close to the cathode. Electrolyte is recirculated from a baffled reservoir to the cathode over which centrifugal action forces the electrolyte to the cathode — work interface.

3 — The Everite Electrochemical Machine Tool H-2 sharpens without abrasion. At the expense of small quantities of electrochemical energy, tools are sharpened very efficiently. Diamond wheel wear is practically eliminated because the diamonds no longer act as cutting edges but merely act as wipers. A smooth, sensitive and practically noiseless shaping operation is convincing as to the inherent electrochemical advantages of this process.

How is the Everite Electrochemical Machine Tool H-2 constructed?

A cathode is located at each end of the stainless steel precision spindle. A cup wheel cathode takes care of the necessary removal and finishing steps on the offhand side. A peripheral wheel cathode is provided for forming chip-breakers. An adjustable protractor and table arrangement on the offhand side allow for considerable flexibility in tool shaping. On the chip-breaker side, the work is held firmly in a universal swivel vise. By use of a table traverse the work can be moved back and forth under the periphery of the cathode. Usually a single pass is sufficient to form an excellent chip-breaker.

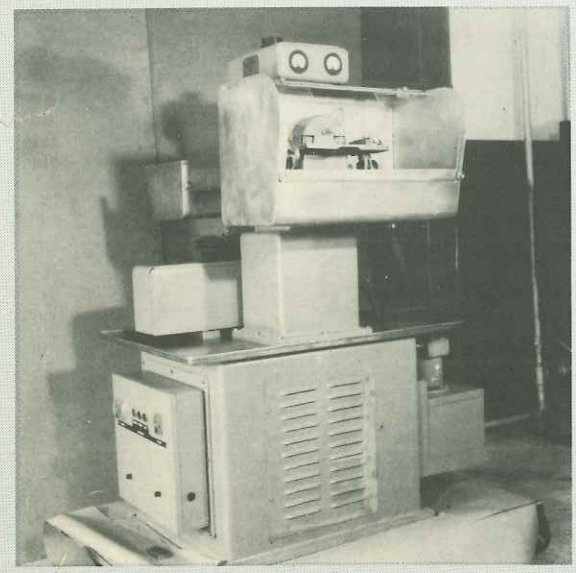
Since the operation is electrochemical in nature, it is important to observe the voltage and current characteristics. This has been facilitated by locating meters at eye-level directly over the center of the machine and above the zone of electrolyte spray. A heavy duty Selenium rectifier incorporated in the base of the machine eliminates the need for additional space and electrical connections. A single knob on the top of the machine controls the rectifier output. A more elaborate control of output is not necessary and would only tend to increase cost.

The electrical circuitry has been designed to avoid current flow across a stationary cathode. Direct current output operates only when the cathodes are rotating. Electrolyte flow is controlled independently by a separate pump switch and a stainless steel three-way valve. Thermal overload protection is provided for all damageable components.

The precision spindle is driven by a heavy duty ¾ horsepower motor connected by a flat belt.

All bearing surfaces and functional parts exposed to the action of the electrolyte are substantially constructed of stainless steel. All visible surfaces not made of stainless steel have been protected with a plastic coating system which is inert to the action of the electrolytes.

A unique approach in adjusting the cathode face to required accuracy is incorporated into the machine and lessens adjustment time.



Built as a single unit, the Electrochemical Machine Tool H-2, consists of a Chip Breaker side and an offhand side. The built-in power source furnishes the required direct current. A rugged centrifugal pump supplies the electrolyte to the cathodes. All vital components which are exposed to electrolyte are made of corrosion resisting steel.

Futuristic in design and compact, the H-2 Machine Tool is a money saver and an asset to any shop. It can be used to machine any conductive material regardless of hardness. In modern day industrial production this machine fills an indispensable need for better and more economically sharpened single point carbide tools.

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Electrochemical machine 51

operation of Everite Electrochemical machine tool H-2

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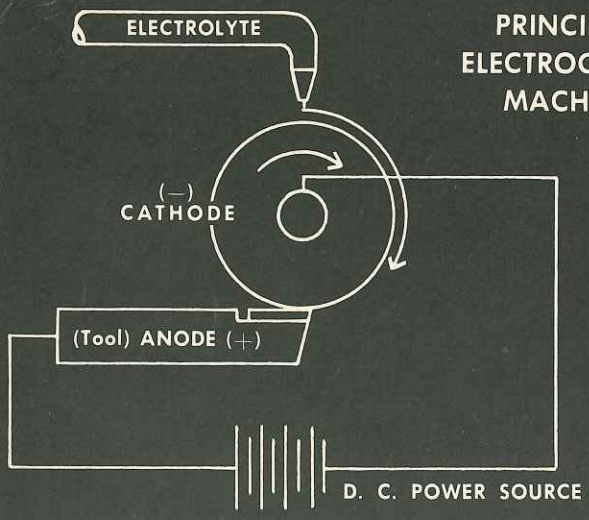

PRINCIPLE OF ELECTROCHEMICAL MACHINING

In the machining process a tool which is made anodic (+) is brought into contact with a rotating wheel, the cathode (−). An electrolyte is used to pass the current between the anode and cathode, thus completing the circuit which causes metal to dissolve at the anode. The material normally formed at the anode is wiped away by rotational action of the cathode. The resultant effect is controlled metal removal by electrochemical dissolution in accordance with Faraday's Laws.

specifications:

Maximum Shank Size of Tools . . . . . 2½" Square

Tool Rest Table . . . . . 8½" x 20"

Tool Rest Table Tilt . . . . . 45° Down, 15° Up

Chipbreaker Table Traverse . . . . . 7"

Chipbreaker Table Elevation . . . . . 3⅛"

Chipbreaker Table Cross Slide Travel . . . . . 4"

Wheel Size, Off-Hand Side, 7" Dia. x 1" Face x 1¼" Bore

Wheel Size,
Chipbreaker Side . . . 6" Dia. x ¼" Thick x 1¼" Bore

Motor
¾ HP; Sealed Ball Bearings; Reversible; Heavy Duty

Electrical Output . . . . . 20 Volts, 150 Amps., D.C.

Standard Wiring . . . . . 220 Volts, A.C.
(Wiring for 440 Volts Available at Slightly Higher Costs)

Spindle Speed . . . . . 3450 RPM

Spindle Mounting . . . . . Sealed Ball Bearings

Height of Spindle Above Floor . . . . . 49"

Overall Height . . . . . 61"

Floor Space . . . . . 44" L. to R.; 38" F. to B.

Weight . . . . . Approximately 1100 lbs.

Shipping Weight . . . . . Approximately 1300 lbs.

All vital parts which are exposed to the electrolyte are constructed of stainless steel.

standard equipment +

standard equipment:

Electrolyte Pump & Reservoir with Piping & Control Valve

3000 Watt D.C. Power Source

2 Ammeters 0—150 Amps.

2 Voltmeters 0—25 Volts

All Switches, Controls & Overload Protectors for operation of machine

Stainless Steel Protractor for Tool Rest Table

Stainless Steel, Cradle Type, Universal Vise for Chipbreaker Grinding

Supply of Electrolyte

Metallurgists have developed extremely hard and durable materials. Industry has found it increasingly difficult to cope with the machining of these hard materials. Electrochemical shaping is a solution to some aspects of this problem. The Everite Electrochemical Machine Tool H-2 is pioneering the use of chemistry and electricity to overcome the machining challenge created by metallurgical progress.

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